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PLANNING DIVISION

# ***Essex Street Corridor Study***

**Andover,  
Massachusetts**

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# Executive Summary

The Essex Street Corridor Study was initiated by the Town of Andover to identify existing and future traffic and parking constraints and to propose feasible solutions that address these constraints. The proposed improvements that are depicted on Figures 9 and 10 present a combination of new roadway construction, circulation changes, access management, pedestrian/bicyclist accommodation improvements, and streetscaping elements. The proposed actions help improve the existing congestion through the area, address pedestrian and bicyclist safety, and improve aesthetics. The alternatives represent a balance of space for the various users of the corridor - vehicles, trucks, pedestrians (including school children), and bicyclists. These improvements were developed in an attempt to not only address operational issues but to also begin to establish this area as a meaningful and desirable place to visit.

The major components of the plan are:

- Dundee Park Drive is proposed as a one-way roadway into Dundee Park at the Essex Street/Railroad Street/Dundee Park Drive intersection. A one-way exit from Dundee Park would be constructed to the west of the intersection. The new roadway intersects Essex Street within town-owned land. On-street parking could be provided along Dundee Park Drive, adjacent to the MBTA tracks, to help alleviate the existing parking shortage at the MBTA station. Coordination with the Dundee Park constituents would be required.
- Pearson Street is proposed as a one-way eastbound roadway (away from the Essex Street/Railroad Street/Dundee Park Drive intersection) from the Department of Public Works (DPW) lot driveway to North Main Street. The portion of Pearson Street from Essex Street to the entrance to the DPW lot would be two-way to allow emergency and public works vehicles to access Essex Street.
- Ridge Street would be discontinued at School Street because of sight distance and safety concerns. The existing curb cut where Ridge Street intersects School Street would be replaced with on-street parking.
- The geometry at the intersection of Essex Street at School Street would be modified by consolidating the School Street approach and departure. Doing so creates a pedestrian path system and green space.
- Signal warrant analyses confirm that traffic signals are currently not warranted at any of the intersections within the study area.

- Pedestrian sidewalk improvements and new crosswalks are proposed at various locations. Specifically, crosswalks are proposed across Railroad Street near The Andover housing complex, across Essex Street at the Railroad Street/Dundee Park Drive intersection, across Pearson Street, and across School Street approaching Essex Street. Continuous sidewalks are provided on both sides of Essex Street.
- Stop signs are proposed at the intersection of School Street and Lupine Road.
- Three alternative cross-section treatments were proposed along Essex Street. They are:
  - Alternative 1 - wide travel lanes with bicyclists sharing the roadway with vehicles;
  - Alternative 2 - dedicated bicycle lanes in both directions of Essex Street; and
  - Alternative 3 - a possible treatment where some on-street parking is removed and replaced with a narrow grass median separating the sidewalks and the travelway.

This plan was developed through a collaborative effort between the Town of Andover, the study advisory group, and engineers and land use planners from VHB. The key outcomes of this plan are:

- Improved operations at the intersection of Essex Street/Railroad Street/Dundee Park Drive through one-way designations on Dundee Park Drive and Pearson Street resulting in less conflicting traffic entering the intersection;
- Enhanced capacity of Dundee Park Drive at Essex Street by providing separate one-way driveways;
- Improved pedestrian and bicyclist accommodations through crosswalk and sidewalk improvements as well as bicycle lane designations;
- Improved motorist safety by addressing sight distance issues between Essex Street and Railroad Street and between School Street and Ridge Street;
- Added on-street parking; and
- Improved aesthetics which help to create a sense of place.

To gain a consensus on these improvements with residents, business owners, and other stakeholders in the area, a public outreach effort should occur that presents the elements of this plan and seeks input. Once the public involvement has occurred and the plan has been refined (if necessary), funding sources will have to be identified for the improvements with a more detailed and engineered design development (this study presents improvements on a conceptual-level).

In addition to local funds, other possible funding sources might include the Massachusetts Highway Department (including Public Works Economic Development (PWED) grants), the Office for Commonwealth Development (including Transit Oriented Development grants), the Merrimac Valley Planning Commission, and the Massachusetts Bay Transit Authority.

# 1

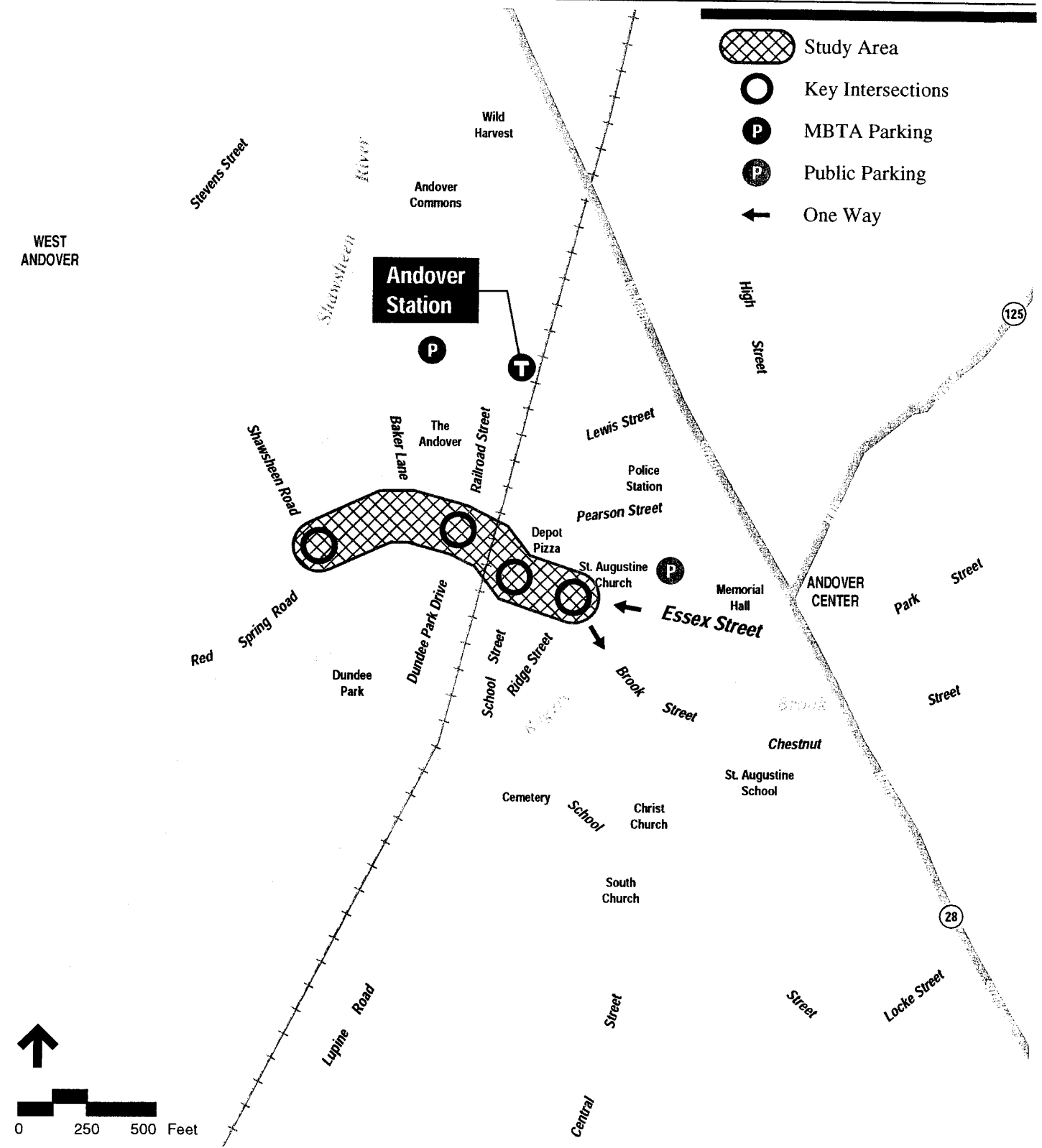
## Introduction

The Essex Street Corridor Study was initiated by the Town of Andover in late 1999 to identify existing and future traffic and parking constraints and to propose solutions that address these constraints. The study was guided by an advisory group selected by the Town of Andover. The Essex Street corridor that was the focus of this study is shown in Figure 1. The corridor extends from Shawsheen Road/Red Spring Road east to Brook Street and included the following unsignalized intersections:

- Essex Street at Shawsheen Road/Red Spring Road;
- Essex Street at Railroad Street/Dundee Park Drive/Pearson Street;
- Essex Street at School Street; and
- Essex Street at Ridge Street/Brook Street.

This report documents the work completed for the study, organized into the following chapters:

- Chapter 1 - Introduction
- Chapter 2 - Existing Conditions
- Chapter 3 - Future Conditions
- Chapter 4 - Alternatives
- Chapter 5 - Alternatives Analysis



Vanasse Hangen Brustlin, Inc.

Study Area Map  
Andover, MA

Figure 1



# 2

## Existing Conditions

This chapter presents an assessment of existing traffic conditions within the study area including parking supply/demand issues, a review of accident data, and roadway geometrics. This assessment will serve as a basis for developing recommendations to the study area corridor.

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### 2.1 Study Area

Essex Street is an east/west collector roadway under the jurisdiction of the Town of Andover that connects West Andover and the Elm Square area of Andover Center. The roadway is two lanes on a moderate west to east upgrade with a speed limit of 30 miles per hour. The Essex Street corridor is shown in Figure 1 and extends from Shawsheen Road/Red Spring Road east to Brook Street and includes the following unsignalized intersections:

- Essex Street at Shawsheen Road/Red Spring Road;
- Essex Street at Railroad Street/Dundee Park Drive/Pearson Street;
- Essex Street at School Street; and
- Essex Street at Ridge Street/Brook Street.

East of Dundee Park Drive, Essex Street becomes part of a one-way pair. Brook Street is one-way eastbound and Essex Street is one-way westbound. Essex Street crosses the Boston & Maine Railroad within the study area at the Railroad Street/Pearson Street/Dundee Park Drive intersection. This railroad serves both Massachusetts Bay Transit Authority (MBTA) passenger traffic as well as freight traffic. Land use along Essex Street is mixed with residences, a church, a pizza shop, and several small offices and retail stores located along the north side of the street near Dundee Park Drive. Essex Street also links to the junior and senior high schools further west of the study area.

In general, vehicles traveling Essex Street do so at or below the 30-mph speed limit. Speeds are constrained mostly because of the moderate roadway grades. Motorists also keep their speeds down as they approach the busy 5-way intersection at Railroad Street/Dundee Park Drive. As discussed later, the commuter trains

travelling through this area have a significant impact on traffic operations within the study corridor.

## 2.2 Existing Traffic Demands

A data collection effort was undertaken to quantify the existing daily and peak hour traffic flows through the study area. This effort involved conducting daily and peak hour traffic surveys at key locations throughout the study area. Pressurized traffic tubes, or automatic traffic recorders (ATRs), count vehicles as they travel over the tube. ATRs were placed across Essex Street, Shawsheen Road, Red Spring Road, Railroad Street, and School Street. In total, seven ATRs were deployed for a 48-hour period in November 1999. The ATR data are summarized in Table 1.

**Table 1**  
**Existing Roadway Traffic Volume Summary**

<u>Location</u>	Daily Volume (vpd) <sup>1</sup>	Morning Peak Hour			Evening Peak Hour		
		Volume (vph) <sup>2</sup>	Percent of Daily Traffic <sup>3</sup>	Peak Flow	Volume (vph)	Percent of Daily Traffic	Peak Flow
Red Spring Road - south of Essex Street	3,900	490	12.5	71 % SB	360	9.2	74 % NB
Shawsheen Road – west of Essex Street	10,300	860	8.3	70 % EB	930	9.0	60 % WB
Essex Street – east of Shawsheen Road	9,500	790	8.3	58 % EB	820	8.6	51 % EB
Railroad Street – north of Essex Street	4,600	290	6.3	53 % SB	320	6.9	58 % NB
School Street – south of Essex Street	6,000	350	5.8	56 % NB	440	7.3	64 % NB
Essex Street – west of School Street	10,000	780	7.8	50 % EB	820	8.2	58 % WB
Essex Street – east of School Street	7,000	470	6.7	54 % EB	440	6.3	52 % WB

Source: ATR counts conducted in November 1999.

1 Two-way daily traffic expressed in vehicles per day (vpd).

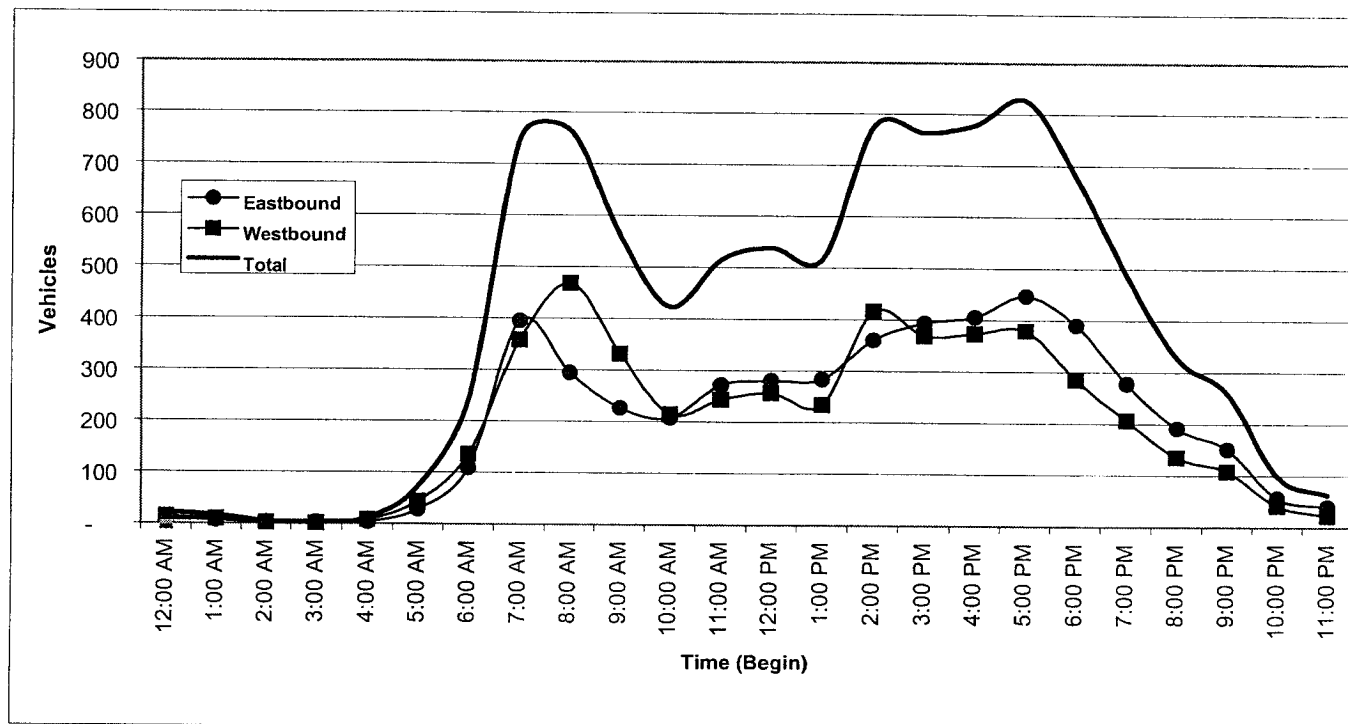
2 Two-way peak hour volume expressed in vehicles per hour (vph).

3 The percent of daily traffic that occurs during the peak hour.

Traffic demands on Essex Street vary from approximately 10,000 vehicles per day (vpd) to 7,000 vpd. The corridor carries the most traffic west of School Street. Continuing west, Essex Street becomes Shawsheen Road and carries about 10,000 vpd. School Street carries about 6,000 vpd and Railroad Street and Red Spring Road each carry under 5,000 vpd. Peak hours flows generally represent between six and nine percent of the daily traffic, with the exception of Red Spring Road which carries about 13 percent of its daily traffic in the morning peak period.

In addition to looking at peak hour trends, it is helpful to understand how the traffic demands on Essex Street fluctuate over the course of a typical weekday. Using the ATR data, Figure 2 presents a daily traffic volume profile for Essex Street, just east of Shawsheen Road. Figure 2 graphically depicts how traffic on Essex Street fluctuates over a typical weekday.

**Figure 2**  
**Essex Street Hourly Demand Fluctuations**



Traffic along Essex Street peaks in the morning from 7:00 AM to 8:00 AM and in the evening from 4:00 PM to 5:00 PM. The corridor has a distinct morning peak period and a considerably longer, less distinct, evening peak period. At about 2:00 PM, traffic increases steadily and peaks at about 5:00 PM. Traffic demands are not significantly heavier in one direction as indicated in Figure 2. Peak traffic demands are slightly higher in the evening peak hour than the morning. In addition, the pedestrian traffic was also high during the peak hours which directly relates to the arrival of the commuter trains. On the east side of Essex Street, notable pedestrian traffic was observed throughout the day, with many destined to the town center.

In addition to the ATR counts, manual counts were taken to quantify peak period traffic turning movements at the key study area intersections and to quantify truck volumes through the corridor. Peak period manual turning movement counts (TMCs) were collected during a weekday from 7:00 to 9:00 AM and from 3:00 to 6:00 PM in November 1999.

Historical traffic data were then reviewed to verify that the November data represents a typical month of the year. Data from nearby Massachusetts Highway Department permanent count stations indicate that volumes for the month of November are historically about 2 percent lower than yearly average traffic volumes. Therefore, the data collected in November were increased by 2 percent to account for seasonal fluctuations in traffic patterns. Figures 3 and 4 present the existing morning and evening peak hour traffic demands.

The peak hour traffic demands in Figures 3 and 4 indicate the following notable trends in traffic flow:

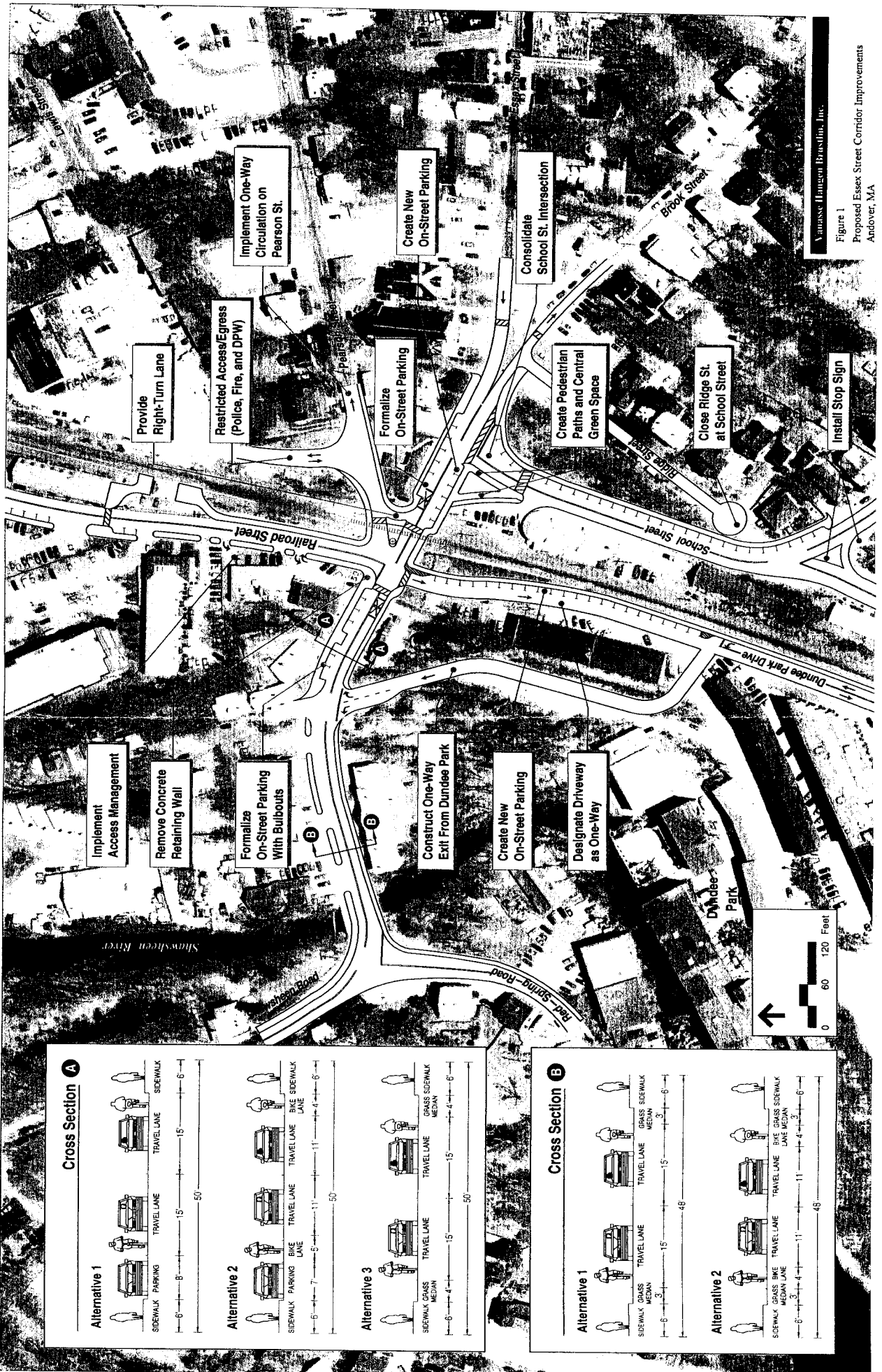
- There are a significant number of right-turns onto School Street from Essex Street. Similarly, the majority of traffic on School Street turns left onto Essex Street.
- There are U-turn movements at the Essex Street/Pearson Street/Railroad Street/Dundee Park Drive intersection. The Pearson Street U-turn movement is negligible (this movement is restricted by signs). There are also a significant number of through movements between Railroad Street and Dundee Park Drive (50 trips in the morning and 85 in the evening).
- About 30 percent of the traffic on Essex Street turns at the Railroad Street/Dundee Park Drive intersection. Exclusive turning lanes are not provided for these turning movements.
- There are significant turning movements onto Red Spring Road in the morning peak hour. The majority of these are right turns from Shawsheen Road.

The TMC data also classified vehicles as either passenger vehicles or trucks. Automobiles, pick-up trucks, vans, and sport utility vehicles are classified as "passenger vehicles". School buses are included in the "truck" category. During the peak periods, about 5 percent of the traffic on Essex Street is comprised of trucks, which is a typical percentage of trucks for a roadway of this type. In the morning peak hour, the majority of these trucks are school buses headed through Essex Street to Shawsheen Road to the junior and senior high schools. Over the course of the day, there is also truck activity entering and exiting the Dundee Park development.

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## 2.3 Existing Traffic Operations

Intersection capacity analyses were conducted to evaluate how well the study area intersections handle the existing traffic demands shown in Figures 3 and 4. All study area intersections are unsignalized.



Yonkers Hanger Bros. Inc.

Figure 1  
Proposed Essex Street Corridor Improvements  
Andover, MA

**Table 1.** Demographic characteristics of study population



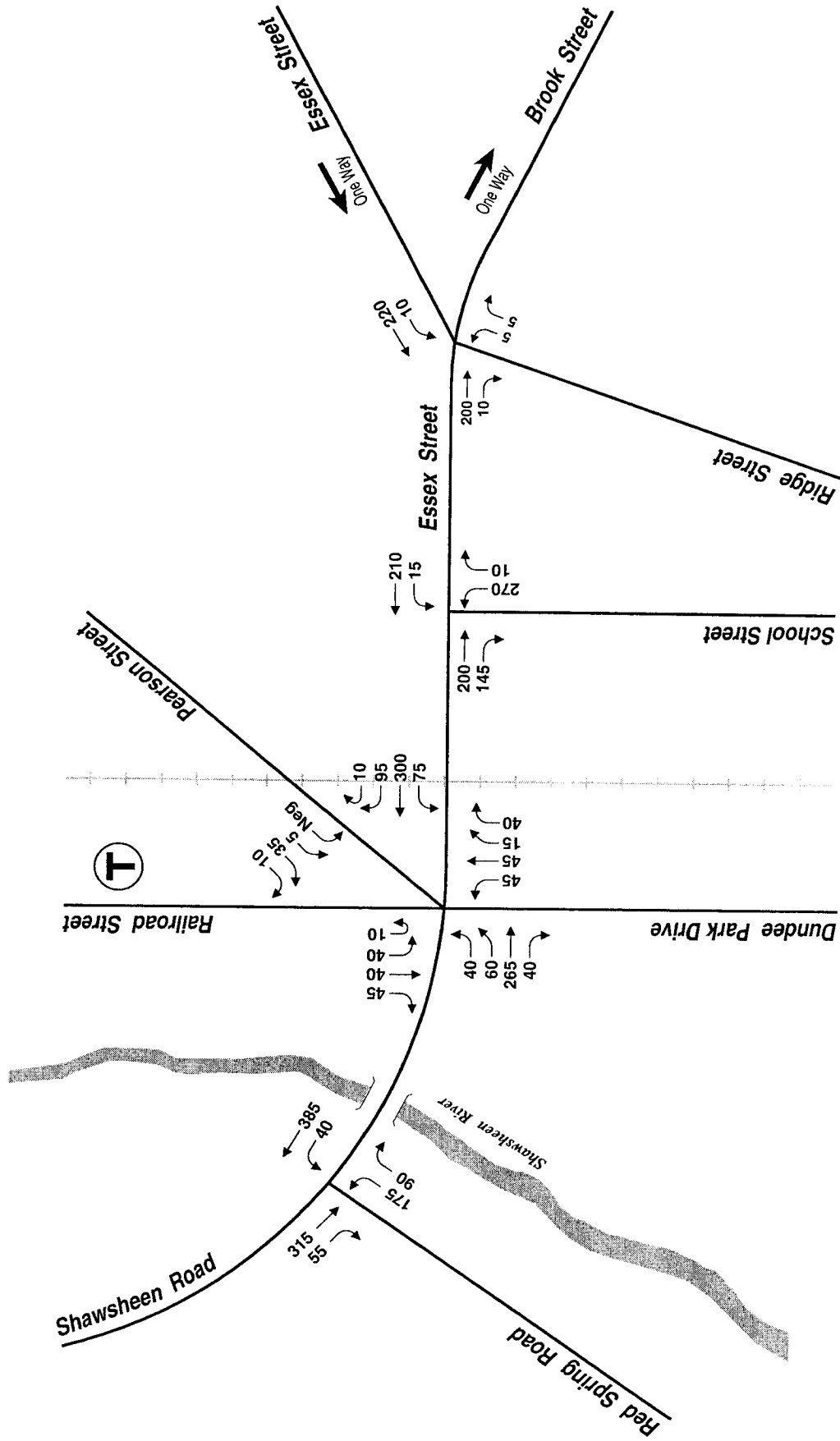
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## 1999 Existing Conditions

Morning Peak Hour Traffic Volumes  
7:00 AM - 8:00 AM

Not to Scale

Neg Negligible (Less than 5 Vehicles)



Vanasse Hangen Brustlin, Inc.

Figure 4  
1999 Existing Conditions  
Evening Peak Hour Traffic Volumes  
4:00 PM - 5:00 PM

Not to Scale

Level-of-service (LOS) is the qualitative designation that represents how well motorists are able to travel the study area without delay. LOS for unsignalized intersections is based on delay and is determined separately for the major and minor street approaches. Similar to a report card, LOS ratings range from LOS A representing the best operating condition (very low delays under 5 seconds) to LOS F, representing a failing operating condition (delays exceeding 50 seconds). LOS D or better conditions (less than 35 seconds of delay) are typically considered to be "acceptable." The estimated delays and resulting LOS designation on the minor street approaches are presented in Table 2.

**Table 2**  
**Capacity Analysis Summary**  
**1999 Conditions**

Intersection	Critical Movement	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Demand <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Demand	Delay	LOS
Essex Street at Red Spring Road	Red Spring Road Northbound Left-turns	50	23	C	175	26	D
Essex Street at Railroad Street/Dundee Park Drive	Dundee Park Drive Northbound	40	25	D	145	>50	F
	Railroad Street Southbound	185	33	D	170	47	E
Essex Street at School Street	School Street Northbound	195	16	C	280	19	C
Essex Street at Ridge Street	Ridge Street Northbound	15	11	B	10	10	B

a: Demand -- Peak hour volume in vehicles per hour (vph) for the specified movement.

b: Delay - Average delay, expressed in seconds per vehicle.

c: LOS -- Level-of-Service, based on delay.

Table 2 indicates that side-street traffic entering Essex Street from Red Spring Road, School Street, and Ridge Street is able to efficiently proceed onto Essex Street with acceptable delays resulting in LOS D or better operating conditions. There are no operational issues during the morning peak hour that result in LOS E or F conditions. At the intersection of Essex Street and Railroad Street/Dundee Park Drive, there are operational issues in the evening peak hour with LOS E/F operating conditions. Traffic exiting Railroad Street and Dundee Park Drive are not provided adequate gaps in the traffic flow on Essex Street to efficiently turn onto Essex Street (or proceed straight across) resulting high delays estimated to exceed 50 seconds on Dundee Park Drive (LOS F) and 47 seconds on Railroad Street (LOS E).

The level of service analyses do not account for delays from passenger or freight trains. When a train approaches the area, railroad crossing signals and crossbucks activate and stop traffic at the intersection of Essex Street and Railroad Street/Pearson Street/Dundee Park Drive. When delays incurred by approaching



trains are considered, the Essex Street corridor operates poorly. Observations taken during peak periods indicate that an approaching train can delay vehicles by well over 1 minute – resulting in LOS F operations with queues extending down Essex Street toward Central Street and down School Street past Lupine Road. Freight trains incur even higher delays than passenger trains – resulting in queues throughout the study area. During the morning peak hour (7:00 to 8:00 AM), there are a total of 3 passenger trains passing the at-grade crossing (2 inbound and 1 outbound). During the evening peak hour (4:00 to 5:00 PM), there are about 2 passenger trains (1 inbound and 1 outbound). Freight trains operate during off-peak hours, typically.

Traffic signal warrant analyses were also conducted to determine if any of the study area intersections warrant signalization. These analyses are based on the ATR traffic volumes. The signal warrant analyses indicate that traffic signals are currently not warranted anywhere within the study area.

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## 2.4 Safety

A safety evaluation was conducted to identify areas of Essex Street that may be unsafe to motorists and pedestrians. This evaluation consisted of compiling and analyzing accident data for the Essex Street corridor, reviewing the existing roadway geometry for design deficiencies, and providing a qualitative assessment of pedestrian needs based on observations.

Accident frequency is one indicator of unsafe roadway design. Through coordination with the Andover Police Department, accident reports were obtained for the Essex Street corridor from January 1996 through 1999. These reports provide relevant details about the accident such as time, severity, and type. Table 3 presents a summary of this data.

Twenty-eight (28) accidents occurred in the study area over a 4-year period. The majority of the accidents (85 percent) occurred during off-peak periods and during the weekday (79 percent). The highest accident occurrence (17 accidents) was reported at the intersection of Essex Street and Brook Street/Ridge Street. Approximately half of the accidents occurring within the study area were angle type collisions and are most likely the result of turning movements opposed by through traffic. Over 80 percent of the accidents yielded property damage only. The relatively low occurrence of personal injury accidents is most likely the result of the low speeds through the study area. As noted previously, vehicles travel the corridor at or below the 30-mph speed limit. None of the intersections are characterized as high crash locations by MassHighway standards (1999 High Accident Intersection Report, Massachusetts Highway Department).

**Table 3**  
**Essex Street Accident Data — 1996 to 1999**

	Essex Street @				Total
	Brook Street/ Ridge Street	School Street	Railroad Street/ Dundee Park Drive/ Pearson Street	Shawsheen Road/ Red Spring Road	
<b>Year</b>					
1996	4	2	0	2	8
1997	7	0	3	0	10
1998	5	0	1	1	7
1999	<u>1</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>3</u>
Total	17	2	6	3	28
<b>Type of Accident</b>					
Angle	9	1	3	3	16
Rear-end	2	1	1	0	4
Head-on	0	0	0	0	0
Unknown-Other	<u>6</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>8</u>
Total	17	2	6	3	28
<b>Accident Severity</b>					
Property Damage Only	14	2	6	3	25
Personal Injury	3	0	0	0	3
Fatality	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	17	2	6	3	28
<b>Time of Accident</b>					
7:00 AM to 9:00 AM	0	1	1	0	2
4:00 PM to 6:00 PM	2	0	0	0	2
Off-peak periods	<u>15</u>	<u>1</u>	<u>5</u>	<u>3</u>	<u>24</u>
Total	17	2	6	3	28
<b>Period</b>					
Weekday	13	2	4	3	22
Weekend	<u>4</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>6</u>
Total	17	2	6	3	28

Source: Compiled by Vanasse Hangen Brustlin, (VHB) Inc. from data provided by the Andover Police Department.

## 2.5 Roadway Geometrics

Along with a review of accidents, locations with deficient sight lines were identified. The ability of side-street traffic to safely turn onto the major street is highly dependent on the sight distance available to the stopped vehicle. The American Association of State Highway and Transportation Officials (AASHTO) has established recommended roadway design standards with sight distance guidelines based primarily on the roadway speeds.

Upon review of the study area roadways, there are three locations where the existing sight distance does not meet the minimum requirements set by AASHTO. They are:

1. Approaching Essex Street on Railroad Street, there is a low 4-foot concrete wall that blocks sight lines. Motorists exiting Railroad Street must advance into Essex Street slightly to see past this obstruction.
2. At the intersection of School Street/Lupine Road/Ridge Street, the curvature of School Street limits sight distance for motorists exiting Ridge Street. Exiting Ridge Street, there is very limited sight distance in both directions along School Street. The fact that Lupine Road operates under YIELD and not STOP control adds to the potential for accidents involving these turning movements.
3. Along Essex Street approaching Railroad Street/Dundee Park Drive, the horizontal and vertical curvature of Essex Street limits sight distance to motorists proceeding along Essex Street.

In addition to evaluating sight lines, the geometry of roadways intersecting Essex Street were evaluated to determine if vehicles can physically turn onto and off Essex Street without encroaching into opposing travel lanes or sidewalk/shoulder areas. Within the study area, there is one location with an inadequate turning radius. Trucks turning right onto Dundee Park Drive do so at very low speeds and at times cannot make the turn without swinging across Essex Street into the opposing travel lane. This is the result of the narrow 24-foot roadway width of Dundee Park Drive and an inadequate turning radius on Essex Street into Dundee Park Drive.

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## 2.6 Pedestrian Safety

In addition to vehicular traffic, Essex Street also serves notable pedestrian traffic. In general, the sidewalks throughout the study area along Essex Street are narrow and the pavement is in poor condition. There are crosswalks provided across Essex Street at the Shawsheen River, across Essex and Brook Streets near the Saint Augustine Church, and across Pearson Street near the church parking lot. The MBTA station, the Junior and Senior High Schools on Shawsheen Road, and the Saint Augustine Church are the major pedestrian-traffic generators in the study area.

The MBTA station generates pedestrian activity to and from the MBTA lot and the on-street parking on School Street. MBTA riders who arrive early enough to park in the MBTA lot cross Railroad Street between the lot and the station. Sidewalks are provided along both sides of Railroad Street up to the MBTA station. The sidewalk on the east side (the side of the station platform) ends abruptly forcing pedestrians across Railroad Street. There is no crosswalk for these pedestrians. Moreover, The Andover apartment building on Railroad Street houses several elderly and handicap residents who frequently cross Railroad Street at this location.

There is also heavy pedestrian activity generated by the overflow of MBTA patrons who park on-street on School Street and Brook Street once the MBTA lot becomes full. These pedestrians cross Essex Street at the 5-way intersection of Railroad Street/Pearson Street/Dundee Park Drive. There is a sidewalk along School Street although there are no crosswalks across Essex Street or School Street to facilitate and control this pedestrian demand. For pedestrians crossing School Street near Essex Street, the sidewalk is discontinuous near the parking area for the Corporate Access building (the old train station). There is a raised curb with no ramped transition from the roadway to the curb generating a disconnected pedestrian way.

The Junior and Senior High Schools on Shawsheen Road generate pedestrian activity that filters through the study area. The majority of the students head down Pearson Street toward the town center, with many destined to the Friendly's Restaurant on the corner of Main Street and Pearson Street. There are sidewalks along Essex Street and Pearson Street, although these pedestrians cross Railroad Street to get to Pearson Street where crosswalks are not provided. Moreover, the sidewalk is discontinuous on Pearson Street near the at-grade crossing.

There is also notable pedestrian flow between the Saint Augustine Church on Essex Street and the Saint Augustine School on Central Street. These pedestrians use the existing crosswalks at the Essex Street/Brook Street junction and proceed down Brook Street. These existing pedestrian crosswalks are barely noticeable as the pavement markings have become faded.

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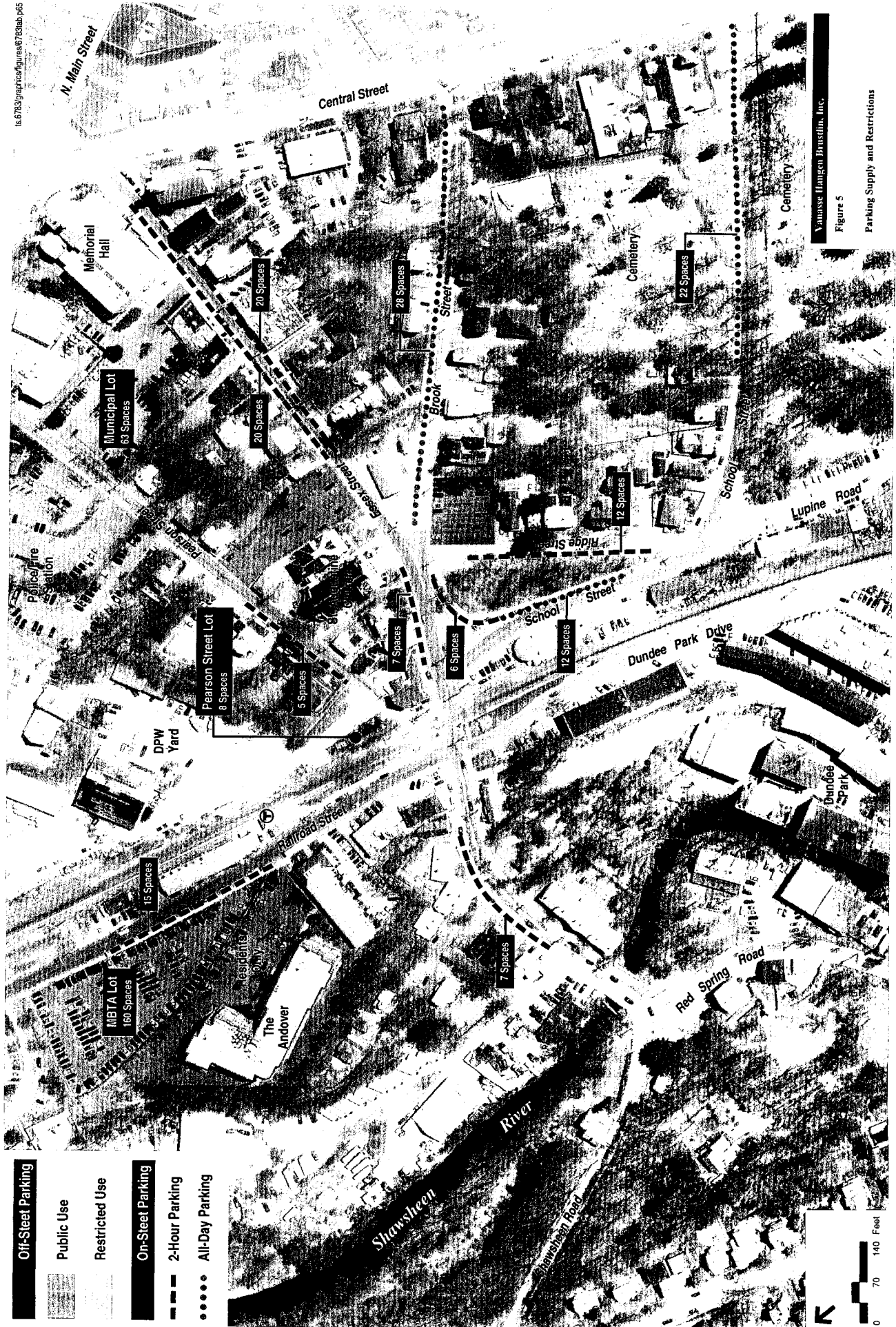
## 2.7 Parking

To fully understand the existing parking utilization within the study area, a parking inventory and utilization survey were conducted. The inventory involved quantifying the available on-street and off-street public parking supply as well as the parking restrictions within the study area. The survey involved parking occupancy and turnover counts at key locations. These counts were conducted at the MBTA lot, the Pearson Street lot (at the DPW entrance), the Municipal Lot at Memorial Hall, and at all on-street parking areas along Essex Street, School Street, Brook Street, Railroad Street, and Pearson Street.

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### 2.7.1 Parking Supply

An inventory of the available parking supply within the study area is presented in Table 4 and depicted on Figure 5. Not highlighted in the figure are various small off-street parking areas that are used solely by retail patrons or employees. Table 4 identifies the estimated capacity of various on and off-street parking areas within the study area and their designated restriction.



There are about 385 parking spaces for public use within the study area. The largest off-street parking is for MBTA commuter rail patrons with 160 spaces (this parking area was recently restriped to accommodate more spaces). The highest concentration of on-street parking is provided along the portion of Essex Street from Central Street to Brook Street. All parking along Essex Street is designated as 2-hour parking. The areas of unrestricted on-street parking are on Pearson Street, Brook Street, and a portion of School Street.

Figure 5 also depicts the private off-street parking lots within the study area. Behind the MBTA lot, there is a parking area for residents of The Andover complex. On Pearson Street approaching Main Street, there is a lot used by the Police/Fire Station only. The Saint Augustine Church on Essex Street across from Ridge Street has two parking lots - one is adjacent to the building and the second is across Essex Street at Ridge Street/Brook Street. These private parking areas were not included in the parking demand survey.

There is also a small parking area (not annotated on Figure 5) at the Dundee Park entrance that is owned by the town. This parking area is not well-defined and not heavily utilized. There may be the perception that this is a private parking area for Dundee Park businesses.

**Table 4**  
**Study Area Public Parking Supply (1999)**

Location	Parking Restriction	Capacity
<b>Off-street</b>		
Andover MBTA Commuter Rail Lot	MBTA Patrons only (no time restriction)	160
Municipal Lot (at Memorial Hall)	Metered	63
Pearson Street Parking Lot (at the DPW entrance) <sup>1</sup>	No restriction	8
<b>On-street</b>		
Essex Street (Central Street to Brook Street)	2-hour (both sides)	40
Essex Street (adjacent to Saint Augustine Church/Depot Pizza shop)	2-hour (north side only)	7
Essex Street (west of Railroad Street)	2-hour (north side only)	7
Brook Street	No restriction (north side only)	28
School Street (adjacent to old train station)	No restriction (east side only)	12
School Street (at Essex Street intersection)	2-hour (east side only)	6
School Street (adjacent to cemetery)	No restriction (north side only)	22
Ridge Street	2-hour (west side only)	12
Railroad Street (curb adjacent to MBTA lot)	2-hour (west side only)	15
Pearson Street	2-hour (west side only)	5
		<b>385</b>

1. This parking area is owned by the town. The town is in the process of prohibiting all-day parking in this area.

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### 2.7.2 Parking Demands

Parking demands within the study area were determined by conducting a parking survey in December 1999. The survey involved all-day (12-hour) parking occupancy counts as well as peak period (8:00 AM to 5:30 PM) parking turnover counts. Occupancy data show the utilization of a parking area over the course of the day. These counts were conducted at the MBTA lot, the Pearson Street lot, the Municipal Lot, and along Essex Street, School Street, and Brook Street. Turnover data shows the duration of time a certain vehicle was parked to identify parking duration violations. The turnover counts were conducted along the heavily used 2-hour parking on Essex Street from Central Street to Brook Street.

On the day of the survey, the MBTA lot was full by 7:00 AM and remained full until about 5:30 PM. Between 7:00 AM and 8:00 AM, vehicles illegally parked in unmarked areas of the lot and at the end of parking aisles. Several vehicles were parked on Railroad Street adjacent to the lot. About 5 to 10 vehicles were illegally parked. Between 4:00 PM and 6:00 PM, the majority of the vehicles exited the lot. The utilization of this parking lot in the morning is consistent with the train schedule where inbound service has a 30-minute window from about 7:10 AM to 7:40 AM and commuters arrive before these trains.

Once the MBTA lot filled, rail patrons seek other all-day parking along School and Brook Streets and at the small Pearson Street parking lot at the entrance to the DPW area. On School Street, adjacent to the old train station, the designated all-day on-street parking is the most desirable parking area for rail patrons once the MBTA lot is full. Just after 7:00 AM, this parking was fully utilized on the survey day. Brook Street also provides unrestricted on-street parking on the north side only. By 7:30 AM, this parking was fully utilized. The portion of School Street adjacent to the cemetery from Lupine Street to Central Street provides all-day on-street parking on the west side. By 9:00 AM, this parking was fully utilized. The Pearson Street parking area near the DPW entrance has designated all-day parking. From 10:00 AM to about 4:00 PM, these 8 spaces were fully utilized. In general, by about 7:30 AM all parking areas close to the MBTA station are fully utilized – forcing patrons to park further away along School Street near Central Street.

The Municipal Lot at Memorial Hall between Essex Street and Pearson Street provides 63 metered spaces. The peak utilization of this lot occurred from 10:00 AM through 5:00 PM. The lot was at or near capacity during these times with less than 10 available spaces. Before 10:00 AM and after 5:00 PM, the lot was at about 30 percent of capacity.

For the majority of the day (10:00 AM to 5:00 PM), the 2-hour on-street parking along Essex Street up to Brook Street was heavily used. The average observed parking duration was one hour and 20 minutes. About 66 percent of the vehicles were parked

for 1 hour or less and about 86 percent for 2 hours or less. About 14 percent of the daily cars violated the 2-hour restriction – this amounts to about 30 vehicles over the course of the day. Of these 30 vehicles exceeding the 2-hour limitation, there were 9 vehicles parked for over 4 hours.

West of Brook Street, Essex Street has 2-hour parking on the north side. There are about 7 spaces in the vicinity of the Saint Augustine Church and the Depot Pizza shop and about 7 spaces west of Railroad Street. The spaces near the pizza shop were used mostly by patrons of the shop and other nearby stores and was used most heavily from 12:00 PM to 3:00 PM. The spaces west of Railroad Street were not used extensively. The 2-hour restriction was not violated in these on-street parking areas.

The other 2-hour on-street parking areas on Railroad Street, Pearson Street and Ridge Street were not heavily used. On Railroad Street, there is 2-hour parking along the curb next to the MBTA parking lot. No more than 5 vehicles were parked along this curb. Of these, two vehicles were parked for over 5 hours (most likely commuter rail patrons). On Pearson Street, no more than 4 vehicles were parked over the course of the day. On Ridge Street, no more than 3 vehicles used this area over the course of the day.

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## 2.8 Summary

This chapter presented an assessment of existing conditions through the study area to include traffic and pedestrian-related issues, parking supply and demand, and safety-related issues. Figure 6 presents a summary of these key findings. They are:

- Speeding along Essex Street was not found to be an issue. Motorists traveling Essex Street do so at low speeds at or below the posted limit of 30-MPH. This is the result of steep grades on Essex Street coupled with frequent turns onto and off Essex Street and on-street parking.
- Traffic along Essex Street peaks in the morning from 7:00 AM to 8:00 AM and in the evening from 4:00 PM to 5:00 PM. The corridor has a distinct morning peak period. At about 2:00 PM, traffic increases steadily and peaks at about 5:00 PM. Traffic demands are slightly higher in the evening peak hour. About 30 percent of the traffic on Essex Street turn at the Pearson Street/Railroad Street/Dundee Park Drive intersection. There are no exclusive turning lanes for these turning movements. During the peak periods, about 5 percent of the traffic on Essex Street is comprised of trucks. In the morning peak hour, the majority of these are school buses headed through Essex Street to Shawsheen Road to the local schools.
- In terms of traffic operations along the Essex Street corridor, there are no operational issues during the morning peak hour that result in LOS E or F conditions. However, there are operational issues in the evening peak hour. At



the intersection of Essex Street and Railroad Street/Dundee Park Drive, traffic exiting Railroad Street and traffic exiting Dundee Park Drive are not provided adequate gaps to efficiently turn onto Essex Street (or proceed straight across) resulting high delays estimated to exceed 50 seconds on Dundee Park Drive (LOS F) and 47 seconds on Railroad Street (LOS E). During peak periods, an approaching train can delay vehicles by well over 1 minute – resulting in LOS F operations with queues extending down Essex Street toward Central Street and down School Street past Lupine Road.

- None of the study area intersections warrant the installation of a traffic signal. This assessment is based on the daily and peak period demands.
- The parking demand generated by the Andover MBTA Station on Railroad Street is the most influential factor related to available parking within this study area. Once the MBTA parking lot becomes full (typically by 7:00 AM), commuters are forced to seek distant on-street parking along School Street and Brook Street. Commuter rail patrons then proceeded to park on-street on School Street and Brook Street. This parking spillover to more distant areas on School Street results in increased pedestrian flows from School Street, crossing the Essex Street/Pearson Street/Railroad Street intersection. There are currently no pedestrian crosswalks at this intersection.
- The parking turnover survey indicated that the 2-hour parking restriction along the one-way portion of Essex Street (from Central Street to Brook Street) effectively discourages the Commuter Rail patrons from parking there. This stretch of Essex Street is a high demand parking area because of its proximity to the town center. The average parking duration was 1 hour 20 minutes. Over the course of the day, there were about 30 vehicles exceeding the 2 hour limitation – about 14 percent of the total number of vehicles parking on this portion of Essex Street. The other 2 hour on-street parking areas along Essex Street, Pearson Street, and Railroad Street were not heavily used.
- There have been 28 accidents in the study area over the past 4-years – an average of 7 accidents per year. None of these accidents resulted in a fatality and the majority involved angle-type collisions incurring property damage only (no personal injuries). These accident trends are indicative of low speeds and heavy turning movements.
- There are substandard roadway geometrics at several locations. On Railroad Street at the Essex Street intersection, a low 4-foot concrete wall restricts visibility (sight distance) to motorists turning onto Essex Street. Also, the steep grades and vertical curvature of Essex Street result in limited sight distance at the Railroad Street/Dundee Park Drive intersection. The curvature of School Street where Ridge Street intersects with Lupine Road restricts visibility for motorists exiting Ridge Street. In addition, the YIELD control on Lupine Road adds to the potential for turning movement conflicts.
- At the intersection of Essex Street and Dundee Park Drive, the narrow width of Dundee Park Drive, coupled with the short turning radius of the roadway is

inadequate for trucks turning onto Dundee Park Drive. As a result, trucks are forced to make this turn at very low speeds, at times, swinging into oncoming traffic on Essex Street.

- The Essex Street corridor lacks pedestrian crosswalks in areas where pedestrian flows are notable. Additional crosswalks would be well served across Railroad Street at the MBTA lot, across Railroad Street at Essex Street, across School Street in advance of Essex Street, and across Essex Street at the 5-way intersection of Essex Street/Railroad Street/Pearson Street/Dundee Park Drive. In addition, the existing crosswalks need to be repainted as they have become faded and barely noticeable to motorists.
- In general, the sidewalks throughout the study area along Essex Street are narrow and the pavement is in poor condition. There are two areas that need sidewalks. On the south side of Essex Street, between Dundee Park Drive and School Street (at the old train station building), there is a raised curb but no well defined sidewalk or proper ramped transition from School Street to the raised curb. The other location lacking a well defined sidewalk is where Pearson Street intersects with Essex Street (near the Depot Pizza shop). Both areas are adjacent to the at-grade rail crossing.

This existing conditions assessment served as a basis for recommending roadway improvements to the Essex Street corridor. As a next step in this study, VHB, the Town of Andover, and the study advisory group worked together to develop a growth strategy. Conceptual improvements were based on the issues under existing and future conditions.

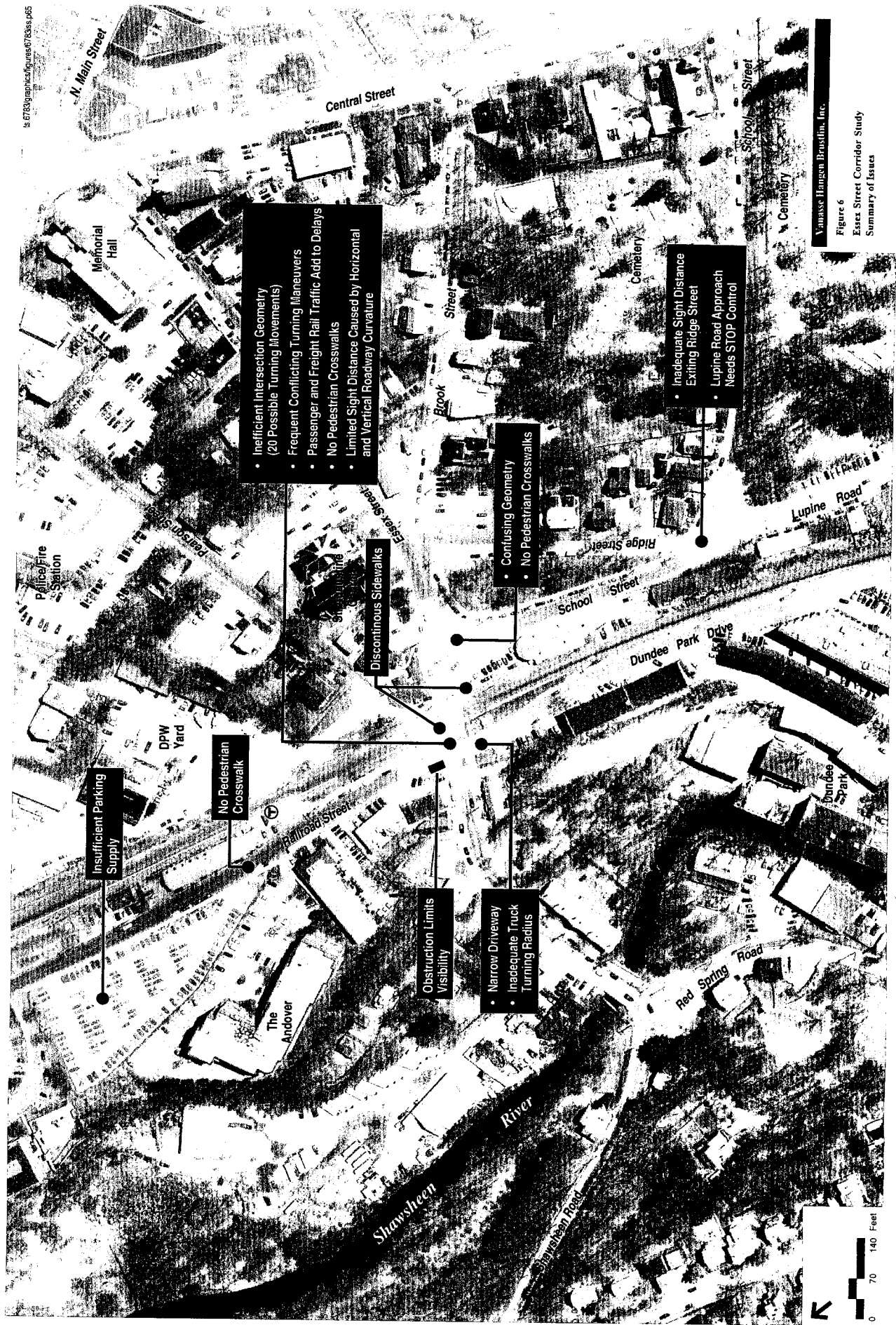


Figure 6  
Essex Street Corridor Study  
Summary of Issues

Yannase Hagen Brosilne, Inc.

# 3

## Future Conditions

Prior to developing improvement alternatives, the potential changes in traffic demands through the Essex Street corridor must be understood. To do so, traffic growth through the Essex Street corridor was estimated. A 5-year projection was assumed for this study, resulting in a future scenario indicative of 2004 conditions.

This chapter summarizes the traffic growth assumptions for the Essex Street corridor and presents the resulting future traffic operations. Traffic growth consists of external growth and development-specific growth. External growth in traffic accounts for general traffic increases attributable to population changes, infrastructure changes, or changes in drivers behavior. Development-specific traffic growth is traffic generated by a new development that is planned.

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### 3.1 External Growth

External growth is the result of general increases in traffic not attributable to a specific development and are generally determined using historical data. Historical traffic volume data were reviewed on I-93 in Andover from MassHighway permanent traffic count stations, and on Essex Street from previous traffic studies in the area. On I-93, north of Route 125, traffic increased by approximately 2 percent from 1997 to 1998. On Essex Street, traffic demands from 1994 to 2000 have increased by approximately 1.5 percent per year on average.

To be conservative, a 2 percent per year growth rate was assumed - resulting in a 10.4 percent increase in the traffic volumes over existing conditions from 1999 to 2004.

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### 3.2 Development-related Growth

In addition to adding external growth to the existing traffic volumes, anticipated and planned developments in the area must be identified. Specifically, there is development potential in Dundee Park. Although there are currently no planned

new or planned Dundee Park tenants, there is the potential for growth. After consultation with the Town of Andover, it was determined that Dundee Park could accommodate up to 100,000 square feet of additional office space if it were fully occupied and expanded. The future conditions assessment assumes an additional 100,000 square feet of office space in Dundee Park. An additional 100,000 square feet of office space would add approximately 140 trips entering Dundee Park in the morning and 140 trips exiting in the evening (based on Institute of Transportation Engineers Trip Generation research data). This assumption would result in almost doubling the existing traffic generated by Dundee Park. Again, this is a conservative assumption and is intended to represent a full build-out of Dundee Park. Figures 7 and 8 depict the projected 2004 traffic volumes through the Essex Street corridor for the morning and evening peak hours, respectively.

### 3.3 Future Conditions Traffic Operations

Table 5 presents the future 2004 capacity analyses without roadway improvements. For these analyses, the existing traffic volumes (Figures 3 and 4) were increased to account for external growth (increased by 10.4 percent) and for potential growth in Dundee Park (an additional 100,000 square feet of office space) to represent 2004 conditions (Figures 7 and 8).

**Table 5**  
**Capacity Analysis Summary**  
**2004 Conditions**

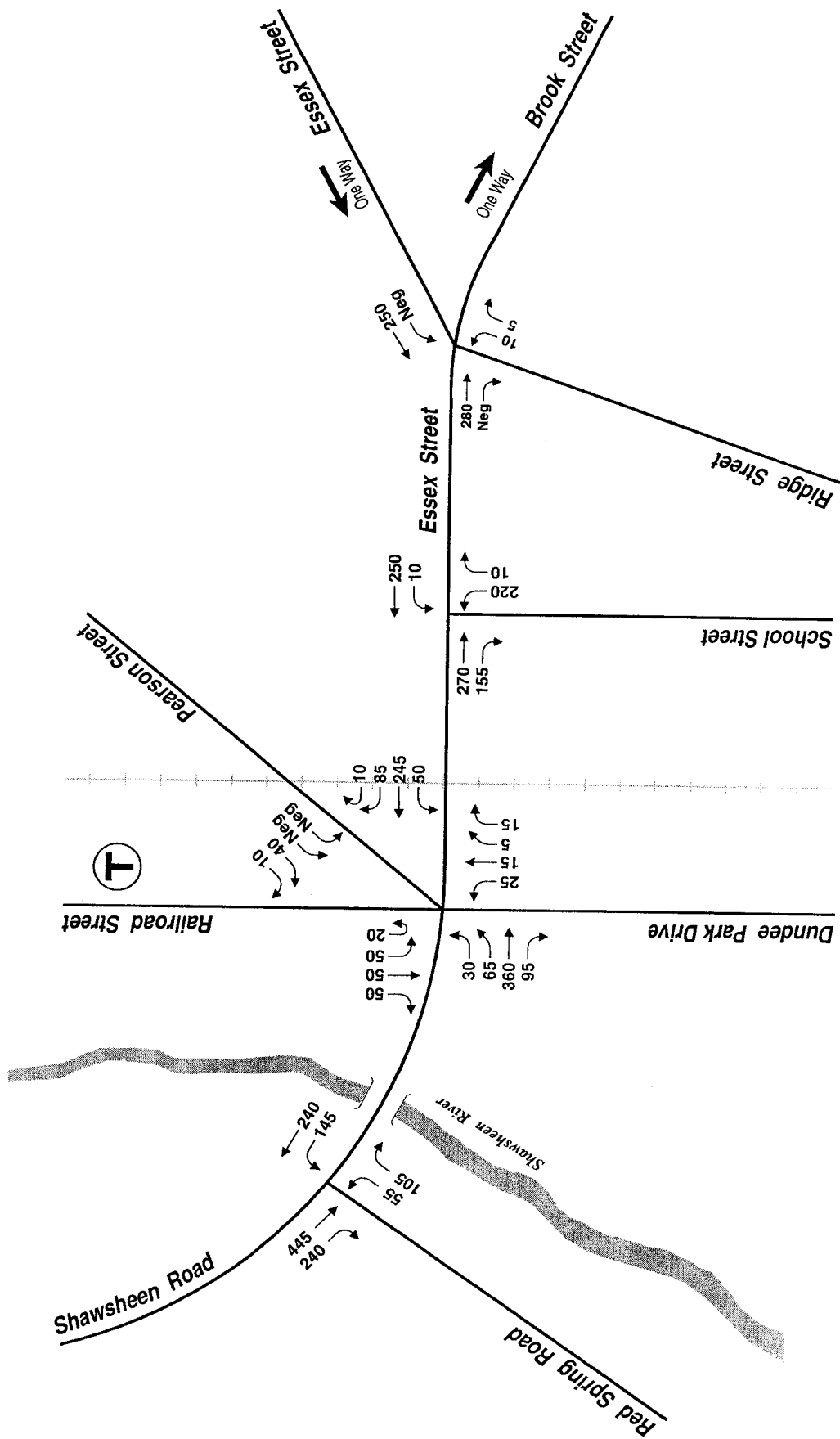
Intersection	Critical Movement	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Demand <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Demand	Delay	LOS
Essex Street at Red Spring Road	Red Spring Road Northbound Left-turns	55	30	D	195	41	E
Essex Street at Railroad Street/Dundee Park Drive	Dundee Park Drive Northbound	60	47	E	285	>50	F
	Railroad Street Southbound	210	>50	F	195	>50	F
Essex Street at School Street	School Street Northbound	230	22	C	320	32	D
Essex Street at Ridge Street	Ridge Street Northbound	15	12	B	10	11	B

a: Demand -- Peak hour volume in vehicles per hour (vph) for the specified movement.

b: Delay -- Average delay, expressed in seconds per vehicle.

c: LOS -- Level-of-Service, based on delay.

Neg Negligible (Less than 5 Vehicles)



Vanasse Hangen Brustlin, Inc.

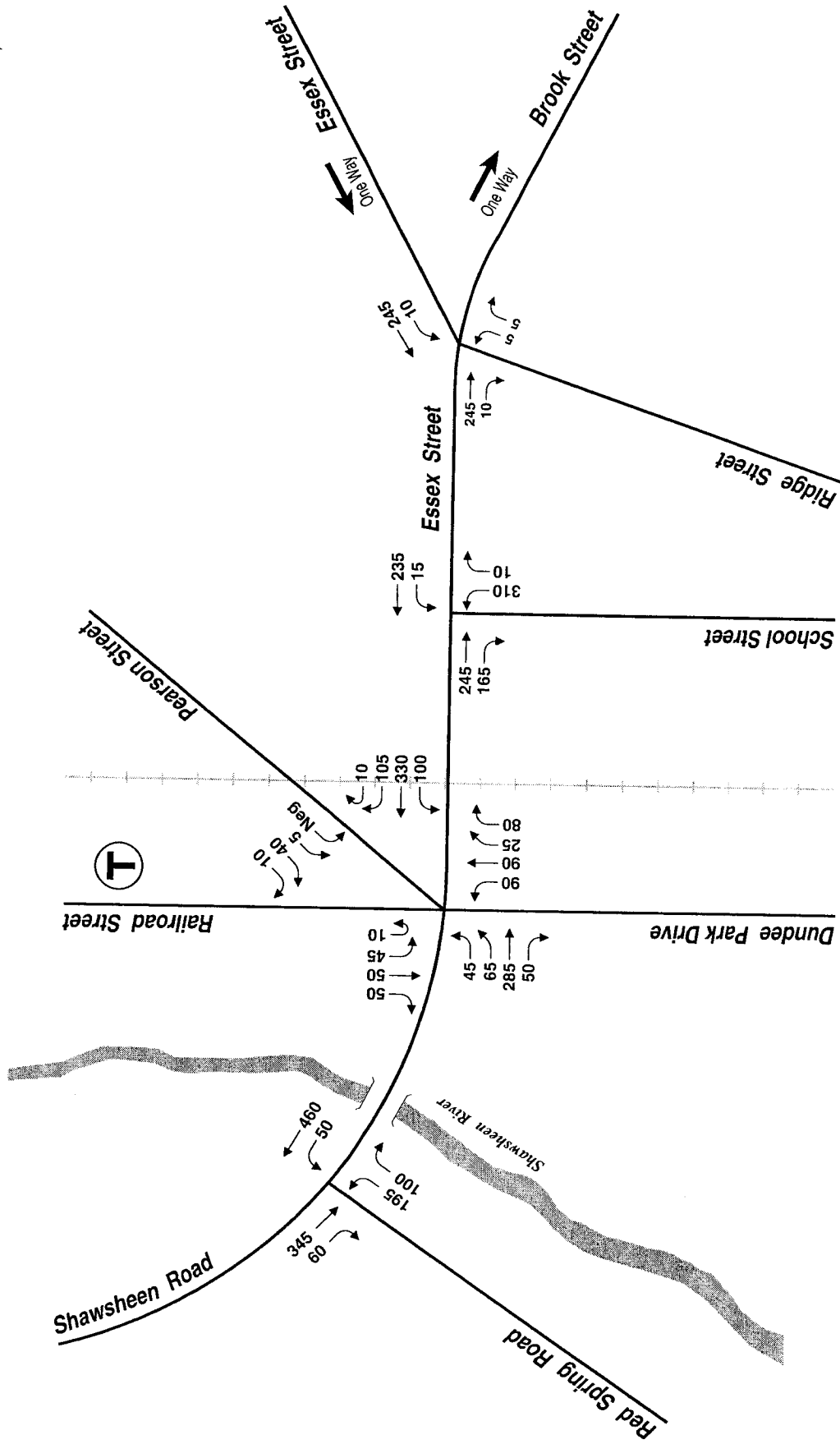
Figure 7

2004 Future Conditions  
Morning Peak Hour Traffic Volumes



Not to Scale

Neg Negligible ( Less than 5 Vehicles)



Vanasse Hangen Brustlin, Inc.

Figure 8

2004 Future Conditions  
Evening Peak Hour Traffic Volumes



Not to Scale

Under existing conditions, LOS E or F conditions occur in the evening peak hour at Red Spring Road and at Railroad Street/Dundee Park Drive. These evening peak hour LOS deficiencies persist under future conditions. The differences between existing and future conditions predominantly occur in the morning peak hour. In the morning peak hour, vehicles entering Essex Street from both Railroad Street and Dundee Park Drive are delayed because of insufficient gaps on Essex Street resulting in LOS E/F operating conditions. These capacity analyses suggest that the development potential of Dundee Park is constrained by the current infrastructure.

The alternatives for the Essex Street corridor are focused on addressing the LOS deficiencies and the safety, geometric, pedestrian, and parking issues raised. It is clear from a capacity standpoint that if Dundee Park is further developed in the future, there needs to be some relief for the Essex Street/Railroad Street/Dundee Park Drive intersection that will make it easier and safer for traffic to enter and exit Dundee Park.



# 4

## Recommended Alternatives

This chapter presents the recommended alternatives considered for the Essex Street corridor. The recommended alternatives were based on a review of existing conditions within the corridor, an understanding of future conditions, and a realization of the potential of what the Essex Street corridor could serve as and represent to the community. The focus was to:

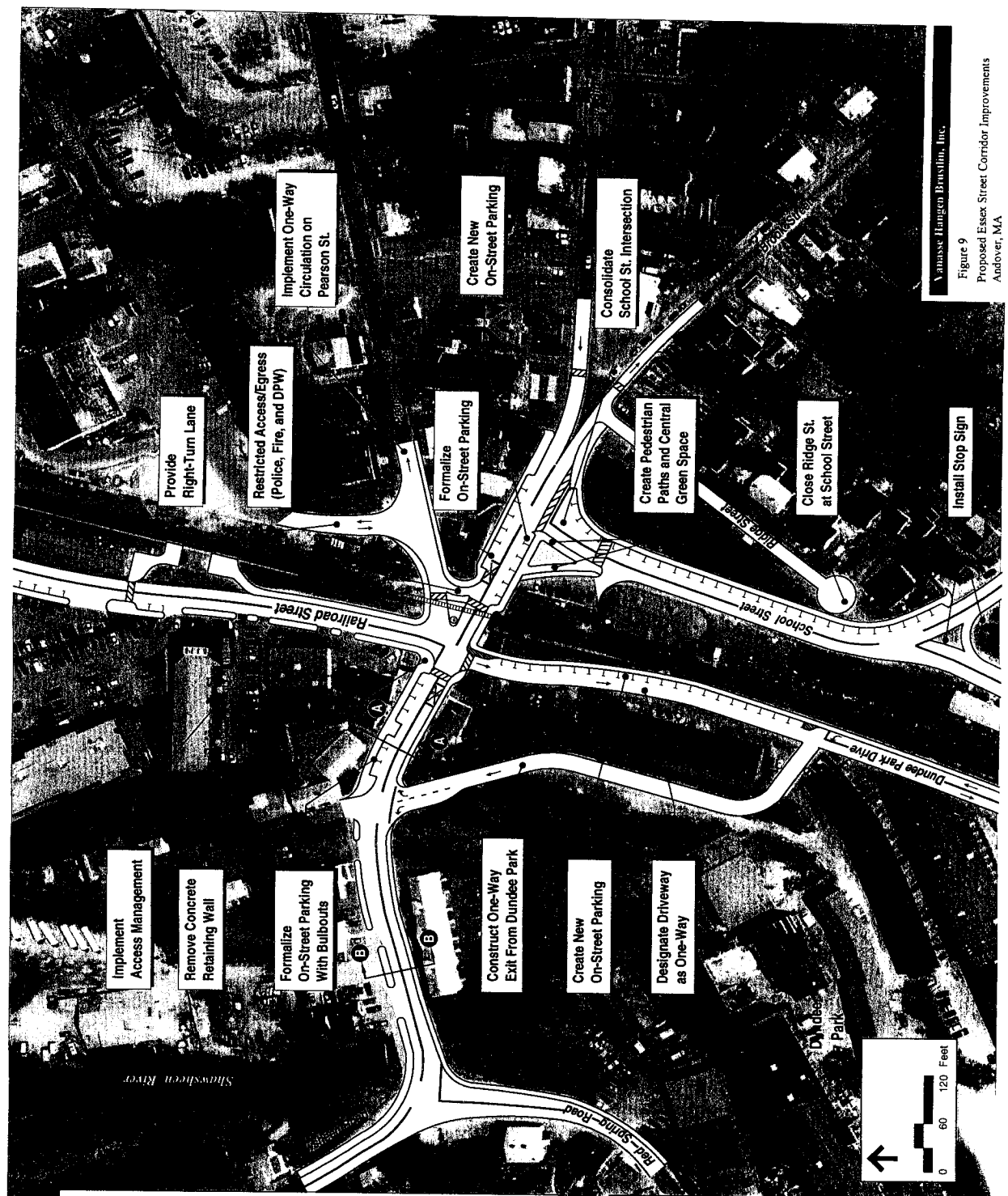
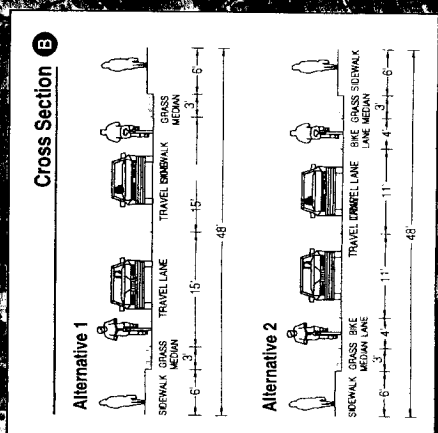
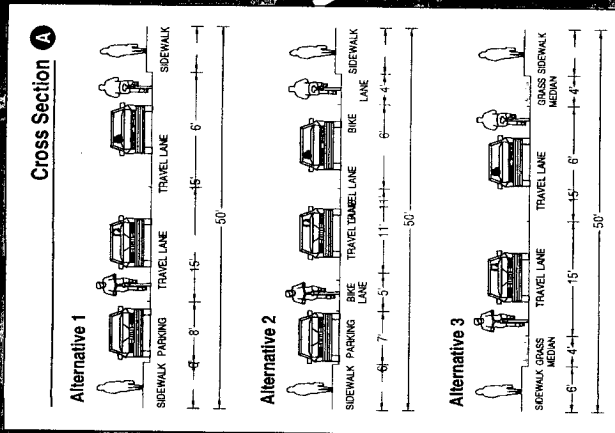
- provide improved vehicle access to the businesses and residents along Essex Street,
- improve traffic operations and safety;
- augment the existing parking supply;
- better accommodate pedestrians and bicyclists, and
- compliment the overall community and serve the needs of all residents.

The alternatives represent a balance of space for the various users of the corridor - vehicles, trucks, pedestrians (including school children), and bicyclists. These improvements were developed in an attempt to not only address operational issues but to also begin to establish this area as a desirable place to visit.

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### 4.1 Proposed Conceptual Improvement Plan

Figures 9 and 10 present the proposed geometric and streetscaping improvements along the Essex Street corridor within the project study area. This plan was developed through a cooperative effort between the Town of Andover, the Study Advisory Group, and VHB engineers and land use planners. The plan includes roadway, sidewalk, and on-street parking improvements. The plan also considers access management improvements along Railroad Street to/from the businesses on the west side of the roadway.



Vanasse Hangen Brustlin, Inc.  
Figure 9  
Proposed Essex Street Corridor Improvements  
Andover, MA



The major components of the plan are:

- Dundee Park Drive is proposed as a one-way roadway into Dundee Park at the Essex Street/Railroad Street/Dundee Park Drive intersection. A one-way exit from Dundee Park would be constructed to the west of the intersection. The new roadway intersects Essex Street within town-owned land. On-street parking would be provided along Dundee Park Drive, adjacent to the MBTA tracks. This parking could be used to help alleviate the existing parking deficiency at the MBTA station. Coordination with the Dundee Park constituents would be required.
- Pearson Street is proposed as a one-way eastbound roadway (away from the Essex Street/Railroad Street/Dundee Park Drive intersection) from the DPW lot driveway to N. Main Street. The portion of Pearson Street from Essex Street to the entrance to the DPW lot would be two-way to allow emergency and public works vehicles to access Essex Street.
- Ridge Street is proposed to be discontinued at School Street (shown as a cul-de-sac on the plan). The existing curb cut where Ridge Street intersects School Street would be replaced with on-street parking.
- The geometry at the intersection of Essex Street at School Street is modified by consolidating the School Street approach and departure. Doing so, a pedestrian path system and central green space area is created.
- At the intersection of Essex Street/Railroad Street/Dundee Park Drive, a channelized right-turn lane is provided between Essex Street westbound and Pearson Street in the vicinity of the Depot restaurant. The geometry of this right-turn lane (i.e. the truck turning radius) is adequate for the type of large trucks that would be turning into the DPW lot. This geometry provides a 45-foot turning radius, approximately.
- Pedestrian sidewalk improvements and new crosswalks are proposed at various locations. Specifically, crosswalks are proposed across Railroad Street near The Andover housing complex, across Essex Street at the Railroad Street/Dundee Park Drive intersection, across Pearson Street, and across School Street approaching Essex Street. Sidewalks are maintained on both sides of Essex Street.
- Stop signs are proposed at the intersection of School Street and Lupine Road.
- Three alternative cross-section treatments were proposed along Essex Street. Within the study area, the width of the roadway varies. VHB has taken two representative cross-section areas - Section A-A, just west of Railroad Street; and Section B-B, just west of the Shawsheen River bridge. At Section A-A (just west of Railroad Street), Essex Street is approximately 50 feet with on-street parking, measured from the back edge of the north sidewalk to the back edge of the south sidewalk. At Section B-B (just east of the Shawsheen River bridge), the sidewalk-to-sidewalk width of Essex Street narrows to about 48 feet and there is no on-street parking. The three alternatives are:

- Alternative 1 - Alternative 1 includes wide 15-foot wide travel lanes (12-foot lanes are typical) with bicyclists sharing the roadway with vehicles. The fact that there is no on-street parking at Section B-B allows for a small grass median area on both sides of Essex Street separating the sidewalks from the travel lane. This alternative does not provide a separate travelway for bicyclists and motorists.
- Alternative 2 - Alternative 2 includes dedicated bicycle lanes in both directions of Essex Street with 11-foot wide travel lanes for vehicles. At Section A-A, the bicycle lane on the north side of Essex Street is wider than on the south side (5 feet vs. 4 feet) as an added measure of safety given the on-street parking on the north side. At Section B-B, both bicycle lanes are 4 feet wide and there is a narrow grass median separating the bicycle lane from the sidewalk. The Essex Street corridor is currently a designated bicycle route. This treatment would help reinforce safety and visibility for bicyclists.
- Alternative 3 - Alternative 3 is a possible treatment for Section A-A where the on-street parking is removed and replaced with a narrow grass median separating the sidewalks and the travelway. This alternative would result in a loss of approximately 6 on-street parking spaces on the north side of Essex Street just west of Railroad Street, however, the entire Essex Street corridor would have a continuous grass median treatment in both directions.

As part of developing these alternatives, the possibility of signaling the Essex Street/Railroad Street/Dundee Park Drive intersection was investigated. However, due to potential conflicts between the traffic signal operations and the at-grade railroad crossing operations, coupled with the steep grades on Essex Street, this idea was discarded from further consideration. The steep downgrade of Essex Street traveling from east to west would raise safety-related issues with eastbound vehicles stopping (and starting) at a steep upgrade (primarily a winter condition concern with icing). Because of these issues, a traffic signal at the intersection was not considered. Traffic signal warrant analyses confirm that a signal is not warranted based on peak hour volumes.

# 5

## Alternatives Analysis

The proposed improvements are expected to result in improved traffic flow and safety through the corridor as well as improved pedestrian and bicyclist safety. There is also the benefit of increased on-street parking to address the existing parking shortage in the area. The existing conditions assessment identified operational issues at the Essex Street/Railroad Street/Dundee Park Drive intersection as well as the need for added long-term parking for MBTA patrons. The operational issues at this intersection are primarily the result of the numerous turning conflicts of vehicles entering the intersection.

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### 5.1 Traffic Operations

The one-way circulation on Dundee Park Drive and Pearson Street simplifies the Essex Street/Dundee Park Drive/Railroad Street intersection by eliminating 8 possible turning movements from the intersection. Currently, there are 20 possible turning movements at this complicated intersection. The existing conditions analysis indicated that in the morning peak hour, approximately 45 vehicles use Pearson Street to Essex Street. In the evening peak hour, this demand was 50 vehicles. The one-way designation of Pearson Street would redirect this traffic to Essex Street via N. Main Street/Central Street. These are relatively low peak hour demands. The impact, in terms of a less direct route to Essex Street from Pearson Street, affects very few vehicles. The impact to vehicles exiting Dundee Park Drive is minimal.

Table 6 presents the level-of-service (LOS) at the study area intersections under existing and forecasted traffic demands with and without the proposed improvements. The traffic forecast includes an additional 100,000 square feet of office space in Dundee Park and a 10.4 percent increase in traffic attributable to external growth.

**Table 6**  
**Capacity Analysis Summary**  
**2004 Conditions with Improvements**

Intersection	Critical Movement	Condition	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
			Demand <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Demand	Delay	LOS
Essex Street at Red Spring Road	Red Spring Road Northbound	No Improvements	55	30	D	195	41	E
		With Improvements	No Change					
Essex Street at Railroad Street/Dundee Park Drive	Dundee Park Drive Northbound	No Improvements	60	47	E	285	>50	F
		With Improvements	60	19	C	285	20	C
	Railroad Street Southbound	No Improvements	210	>50	F	195	>50	F
		With Improvements	190	>50	F	185	>50	F
Essex Street at School Street	School Street Northbound	No Improvements	230	22	C	320	32	D
		With Improvements	No Change					
Essex Street at Ridge Street	Ridge Street Northbound	No Improvements	15	12	B	10	11	B
		With Improvements	No Change					

a: Demand -- Peak hour volume in vehicles per hour (vph) for the specified movement.

b: Delay - Average delay, expressed in seconds per vehicle.

c: LOS -- Level-of-Service, based on delay.

The capacity analysis presented in Table 6 indicates that although the proposed improvements do not address the LOS E/F condition for traffic exiting Railroad Street, the changes are expected to improve operations for traffic exiting Dundee Park. Under the future 2004 conditions with the proposed improvements, the exiting driveway from Dundee Park is relocated. With a relocated exiting driveway from Dundee Park, the removal of vehicles attempting to cross Essex Street significantly improves the operation and safety of this intersection.

## 5.2 Safety

In addition to the improved traffic flow through the corridor, the proposed improvements are expected to address existing safety concerns for motorists, pedestrians, and bicyclists. Closing Ridge Street at School Street eliminates the safety issues caused by the limited sight distance for vehicles exiting Ridge Street. The resulting impact would be less direct access to School Street and Lupine Road from Ridge Street. In the morning peak hour, less than 5 vehicles were recorded turning onto Ridge Street from Essex Street. In the evening peak hour, 20 vehicles turned onto Ridge Street from Essex Street - probably mostly residents of Ridge Street who would not be exiting at School Street. Given the very low demands that would be redirected as a result of closing Ridge Street at School Street, this improvement has minimal impacts but significant positive safety implications. The Andover Fire

Department would have to review this proposed road closure to identify any issues related to public safety and emergency vehicle access.

Removing the concrete wall on the west side of Railroad Street at Essex Street will help improve sight distance for vehicles on Railroad Street. The wall blocks the line of sight for motorists turning onto Essex Street from Railroad Street. The wall does not appear to provide structural support.

The proposed pedestrian crosswalks and improved sidewalks will help consolidate the pedestrian flows through the area - resulting in added safety for pedestrians. The parking shortage at the MBTA station parking lot and the remote location of other long-term parking results in heavy uncontrolled pedestrian flows through the Essex Street/Railroad Street/Dundee Park Drive intersection. By providing improved sidewalks, a central green space, and well-marked convenient crosswalks, pedestrians will be encouraged to cross Essex Street in a safer, more controlled manner.

The proposed cross sections include the provision of bicycle lanes (either as a designated or shared lanes) on both sides of Essex Street. Given that the corridor is a designated bike route, this provision would help encourage bicyclists to use the corridor and help improve safety.

The proposed new exit roadway for Dundee Park intersects Essex Street with somewhat limited sight distance. This sight distance is limited by the grades along Essex Street and the presence of heavy brush along the south side of Essex Street in the vicinity of the proposed driveway. To accommodate the proposed driveway, this brush area must be properly cleared so that motorists exiting the driveway will have adequate sight distance along Essex Street.

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## 5.3 Parking

One concern in this study area was the severe shortage of long-term parking for patrons of the MBTA station. Parking accumulation data collected at the MBTA lot on Railroad Street across from the station platform indicates that the lot is full by 7:00 AM and then patrons are forced to seek more remote on-street parking within the area. The proposed improvements will increase the number of on street parking spaces, which could be designated as long-term. Table 7 presents a summary of the estimated parking space gain from existing to proposed conditions.



**Table 7**  
**Study Area Public Parking Supply – Existing and Proposed**

<b>Existing Parking Supply</b>	<b>Parking Restriction</b>	<b>Capacity</b>
<b>Off-street</b>		
Andover MBTA Commuter Rail Lot	MBTA Patrons only (no time restriction)	160
Municipal Lot (at Memorial Hall)	Metered	63
Pearson Street Parking Lot (at the DPW entrance) <sup>1</sup>	No restriction	8
<b>On-street</b>		
Essex Street (Central Street to Brook Street)	2-hour (both sides)	40
Essex Street (adjacent to Saint Augustine Church/Depot Pizza)	2-hour (north side only)	7
Essex Street (west of Railroad Street)	2-hour (north side only)	7
Brook Street	No restriction (north side only)	28
School Street (adjacent to old train station)	No restriction (east side only)	12
School Street (at Essex Street intersection)	2-hour (east side only)	6
School Street (adjacent to cemetery)	No restriction (north side only)	22
Ridge Street	2-hour (west side only)	12
Railroad Street (curb adjacent to MBTA lot)	2-hour (west side only)	15
Pearson Street	2-hour (west side only)	5
<b>Existing Supply:</b>		<b>385</b>
<b>Additional Parking Supply</b>		
Dundee Park Drive (east side, adjacent to tracks)	No restriction	+20
School Street (with discontinuation of Ridge Street)	No restriction	+5
Essex Street (south side, across from Depot Pizza)	2-hour	+5
<b>Change:</b>		<b>+30</b>
<b>Proposed Supply<sup>2</sup>:</b>		<b>415</b>

1. This parking area is owned by the town. The town is in the process of prohibiting all-day parking in this area.

2. Under Alternative 3 (Cross Section A-A) there is a loss of approximately 6 on-street spaces. The proposed supply would be 399 spaces under Alternative 3 - a net increase of 14 spaces for the study area.

Table 7 indicates that the proposed concept plan adds approximately 30 on-street parking spaces to the area. Of these, 25 could be designated as long-term parking spaces for MBTA patrons. The remaining 5 spaces are convenient to the businesses/restaurants along Essex Street and would be well used as 2-hour parking. Given the existing parking shortage in the area for MBTA patrons, this added parking does not fully address the long-term parking needs. The Town has recognized the long-term parking shortage in the area and, concurrent with this study, is looking at potential station improvements at the Andover station on Railroad Street which includes parking options.

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## 5.4 Summary

The proposed improvement plan on Figures 9 and 10 present a combination of new roadway construction, circulation changes, access management, and pedestrian/bicyclist accommodation improvements to help improve the existing congestion through the area. The improvements shown on the concept plan are expected to address existing congestion and safety-related issues through the corridor. The Streetscape Plan on Figure 10 addresses issues of aesthetics in the study area. The existing parking shortage in the area is slightly improved, however the long-term parking shortage for MBTA patrons is not addressed.

The key benefits of this plan are:

- Improved operations at the intersection of Essex Street/Railroad Street/Dundee Park Drive through one-way designations on Dundee Park Drive and Pearson Street resulting in less conflicting traffic entering the intersection;
- Enhanced capacity of Dundee Drive at Essex Street by providing separate one-way driveways;
- Improved pedestrian and bicyclist safety through crosswalk and sidewalk improvements as well as bicycle lane designations;
- Improved motorist safety by addressing sight distance issues between Essex Street and Railroad Avenue (by removing the concrete wall) and between School Street and Ridge Street (by discontinuing the Ridge Street connection);
- Added on-street parking areas; and
- Improved aesthetics to help create a sense of place.